Ancient Climate

刘会平，王开发，1998，沪杭苏地区若干文化遗址的孢粉-气候对应分析，地理科学，18(4): 368-373

本文运用了对应分析方法研究了沪、杭、苏地区三个文化遗址孢粉与气候的关系。结果表明，马家浜文化期和崧泽文化期（属全新世大西洋期）年均温比现在高1~3℃；良渚文化期（属全新世亚北方期）温度则比现在低1.5℃左右。年降水量各地有所不同，以马家浜期末和崧泽期初最为潮湿，降水量比现在高150~300 mm。

关键词：文化遗址 孢粉 气候变迁 对应分析

Liu Huiping and Wang Kaifa. 1998. A study on the relation between spore-pollen assemblages and climate in the New Stone Age of Changjiang Delta by correspondence analysis. Scientia Geographica Sinica 18(4):368-373.

Based on data of some spore-pollen assemblages from three culture ruins, the climate features of the Late Stone Age in the Changjiang Delta were revealed by correspondence analysis. In Majiabang and Songze culture stages, the climate was warmer and the mean annual temperature was 1 to 3°C higher than that at present. In the Liangzhu culture stage, the climate was cooler and the mean annual temperature was about 1.5°C lower than that at present. Precipitation was very different in different stages and areas. In the late Majiabang stage and the early Songze stage, it was humid and the mean annual precipitation was 150 to 300 mm higher than that at present.

Keywords: culture ruin, spore-pollen, climate change, correspondence analysis

*王建力*等，1998，临夏盆地早更新世东山古湖沉积的高分辨率气候及录，地理科学，18(4): 349-354

本文根据临夏盆地东山古湖沉积采样数据，建立了气候变化曲线，并对曲线进行周期分析，结果表明，东山古湖所反映的气候波动具有明显的41,000a主导周期，表明东亚季风在建立初期具有不稳定性。

关键词：早更新世 气候波动 东亚季风 临夏盆地

Wang Jiangli et al. 1998. Early Pleistocene of lacustrine high resolution climate of Dongshan Lake in Linxia Basin. Scientia Geographica Sinica. 18(4):349-354.

A model of climate changes was built based on data of carbonate samples taken from lacustrine deposits in the Linxia Basin. The spectrum analysis results show that the paleoclimate had a clear 41,000 year dominant periodicity, suggesting that the monsoon climate was not stable in the Early Pleistocene.

Keywords: Early Pleistocene, climate change, East Asia monsoon, Linxia Basin

*朱士光*等，1998，历史时期关中地区气候变化的初步研究，第四纪研究，1998(1): 1-11

本文根据历史资料将关中地区历史时期气候划分出全新世早期寒冷、全新世中期暖湿、西周冷干、春秋至西汉前期暖润、西汉后期至北朝凉干、隋唐前中期暖湿、唐后期至北宋凉干、金前期温干、金后期和元凉干等10个气候变化阶段，从而建立起该地区历史时期完整的气候变化序列。

关键词：历史时期 关中地区 气候变化

Zhu Shiguang et al. 1998. Study on climate variations in the region of Guanzhong in the historical period. Quaternary Sciences 1998(1):1-11.

Based on data of historical record, the authors divided climate changes in the area in the historical period into 10 stages as follow: (1) The early Holocene (10,000–8,000 year BP), frigid climate period. (2) The middle Holocene (8,000–3,000 year BP), warm and humid climate period. (3) The 11th Century BC–8th Century BC, frigid and arid climate period. (4) The 8th Century BC–1st Century BC, warm and humid climate period. (5)The 1st Century BC–6th Century AD, cold and arid climate. (6)The 7th Century AD–8th Century AD, warm and humid climate. (7) The 9th Century AD–11th Century AD, cold and arid climate period. (8) The 12th Century AD was a warm and arid climate period. (9) The early 13th Century AD– Early 14th Century AD, cold and arid climate. (10) The early 14th Century AD– Early 20th Century AD, frigid and arid climate.

Keywords: historical period, Guanzhong area, climatic changes

*丁仲礼*等，1998，灵台黄土－红粘土序列的磁性地层及粒度记录，第四纪研究，(1): 86-93

本文研究了甘肃灵台县任家坡黄土－红粘土序列的磁性地层及粒度记录。结果表明，中国北方连续的风成堆积可下推到7.05 Ma BP。第三纪红粘土的粒度组成从上到下变化很小，与黄土-古土壤序列的粒度大幅度变化形成强烈的反差，意味着晚第三纪时期的气候总体上要比第四纪时期稳定。

关键词：第三纪红粘土 风成堆积 古季风

Ding Zhongli et al. 1998. Magnetostratigraphy and grain size record of a thick red clay-loess sequence at Lingtai, the Chinese Loess Plateau. Quaternary Sciences (1):86-93.

Magnetostratigraphy and the grain-size record of a thick red clay-loess sequence at Lingtai in the Chinese Loess Plateau are studied in this paper. The results suggest that the eolian red clay at Lingtai began to accumulate at about 7.05 Ma BP. The grain-size record shows that in the entire red clay sequence, the particle size of all the samples does not show significant variation. This contrasts strikingly with the overlying loess-paleosol sequence in which the grain size of loess beds is proportionally coarser than that of soils. These results suggest that the climate during this period could have been relatively stable.

Keywords: Tertiary red clay, eolian deposit, paleomonsoon

*周杰*等，1998，130ka BP
前后黄土高原东部地区的气候侵蚀事件，中国沙漠，
18（2）：105-110

通过黄土高原塬区、梁峁区和断陷谷区典型沟谷的阶地堆积、侵蚀面ji及其与之相邻的黄土－古土壤地层序列研究，并结合古气候特征分析，提出倒数第二次冰期冬季风向末次间冰期夏季风过渡期高原东部地区发生了强烈的气候侵蚀事件。沉积物特征研究和古气候复原结果表明，此次侵蚀是一次以暴雨为主要动力的快速侵蚀事件。
关键词：黄土高原 季风
气候过渡期 侵蚀事件

Zhou Jie et al. 1998. Climatic erosion event occurred in the eastern Loess Plateau at about 130 ka BP. Journal of Desert Research 18(2):105-110.

From a study of the terrace deposits, erosion surface, and the neighboring loess-paleosol sequence from different erosion profiles located in flat land and hill land as well as in valley regions of the Loess Plateau, and links to the analysis of proxy indices of paleo-climate, three results are concluded. (1) The development of T3 terraces of the gullies in flat land, hill land and valley regions of the eastern Loess Plateau, and their identical deposit features, which include sand-gravel, sub-clay, and fluvial loess layers, indicate that they are sediments from a period of strong erosion. (2) The analysis of climatic proxy indices, such as magnetic-susceptibity, carbon-13 and variablity of magnetic-susceptibility, reveal a greater climatic gradient or greater precipitaton variability at about 130 ka BP, which shows, on one hand, that precipitation increased sharply, and on the other hand, that the precipitation contribution with time was rather uneven. (3) The deposits on the T3 terrace were sand mixed with gravel. The poor sorting implies that this erosion event was probably driven by high-intensity rainstorms.

Keywords: Loess Plateau, monsoon, climatic change period, erosion event

*靳鹤龄*等，1998，0.8Ma BP
以来西藏雅鲁藏布江中游地区沙地演化和气候变化，中国沙漠，
18（2）：97-104

根据地表沉积相特征及其对气候变化的反映，着重探讨了西藏雅鲁藏布江中游地区沙地形成时代、演化过程和气候变化。沙地早在中更新世中期的0.8Ma BP就已出现，经历了强烈发展、缓慢发展和相对稳定

Jin Heling et al. 1998. The sandy land evolution and climatic change in the middle course area of the Yarlung Zangbo River in Tibet, China since 0.80 Ma BP. Journal of Desert Research 18(2):97-104.

This paper uses sedimentary facies, magnetic susceptibility and some chemical elements, and debris minerals as indices to analyze the sandy land evolution and climatic changes in middle course area of the Yarlung Zangbo River. The period and model of sandy land evolution and climatic changes were set up as: (1) 0.80-0.518 Ma BP sandy land was developing slowly with narrowing, fixed intervals and a climate

和缩小与固定的多次迭覆更替，并呈不断扩大趋势。与此同时，气候也经历了冷干和暖湿的多次变化，并表现出不断向干冷化方向发展的趋势。

关键词：西藏 雅鲁藏布江 沙地演化 气候变化

characterized as warm-humid dominantly, but warm-humid alternating with cold-arid appearance. (2) 0.518-0.08 Ma BP, the eolian sand deposit increased which showed that the sandy land area was developing quickly and that the climate was cold and showed semi-arid or arid conditions. (3) 80-10 ka BP, eolian sand almost covered everywhere, which indicated sandy land persistent drought, and the contemporary sand-field pattern was formed in this period. (4) After 10 ka BP, the sandy land had been fixed, which reflected the warm-humid climate in the optimum period followed by a period of frequent climate fluctuations.

Keywords: Tibet, Yarlung Zangbo River, sandy land evoution, climatic changes

许英勤，1998，新疆博斯腾湖地区全新世以来的孢粉组合与环境，干旱区地理，21（2）：43-49

本文通过对新疆博斯腾湖地区沉积物的孢粉分析，讨论了全新世以来的植被和气候变化的四个阶段，并结合其它沉积特征，反映了这一时期湖泊的水面的收缩和扩张的状况和自然环境的演变。

关键词：博斯腾湖 孢粉组合 环境

Xu Yingqin. 1998. The assemblage of Holocene spore pollen and its environment in Bosten Lake Area of Xinjiang. Arid Land Geography 21(2):43-49.

Bosten Lake located in the Yanji basin on the southern slope of the Tianshan Mountains. The paper presents results of pollen analyses on sediment of the Holocene in which six pollen zones are defined. According to assemblage characteristics of the spore-pollen, vegetation change was defined in four stages since the Holocene. Analysis shows that the climate of the Bosten Lake area has been arid since the Holocene. During the period from the middle of the middle-Holocene to the early late-Holocene, the climate has been relatively warm and humid. Since the Holocene, under the influence of climate change, the Bosten Lake area has expanded or shrank many times.

Keyword: Bosten Lake, spore-pollen assemblage, environment

*贾铁飞*等，1998，乌兰布和沙漠北部沉积物特征及环境意义，干旱区地理，21（1）：36-42

根据乌兰布和沙漠北部地区典型剖面记录，对各层沉积物进行了结构分析，在对沉积物性质、特点进行分析判断的基础上，初步揭示了各层沉积物的环境意义，并依次对乌兰布和沙漠的形成、发展与环境变迁间的关系做了初步探讨。认为乌兰布和沙漠的形成演化主要受自然环境变化的影响，人为因素应是叠加其上的辅助因素。

关键词：乌兰布和沙漠 沉积物特征 沉积环境 环境变迁

Jia Tiefei et al. 1998. On the features and meaning of sediment in northern Ulan Buh sandy land. Arid Land Geography 21(1):36-42.

On the basis of field investigations at the northern part of the Ulan Buh Sandy Land, two profiles were selected for analysis. This paper covers the analysis of sedimentary grain size, triangular diagram, and cumulative curve. The main conclusions are as follows: (1) Ulan Buh Sandy Land is not a man-made desert after the Han Dynasty, but is the result of natural environmental evolution. (2) The forming time of the Ulan Buh Sandy Land is early Holocene or even the late stage of the late Pleistocene, which is an eolian sand epoch in Northern China. (3) The evolution pattern of Ulan Buh Sandy Land is the same as that of environmental change in Northern China, and the human factor is only a subordinate factor. (4) The forming and evolution of Ulan Buh could be connected with the alluviation of the Yellow River which may be a focus of a study of Ulan Buh's environmental evolution in the future.

Keywords: Ulan Buh Sandy Land, feature of sediment, sedimentary environment, environmental evolution

曾永年，1998，柴达木盆地沙漠沉积中的新仙女木事件记录，干旱区地理，21（1）：25-28

对柴达木盆地晚更新世沙漠演化过程的研究，发现青藏高原沙漠沉积中清楚地记录了新仙女木事件，并呈干冷降温的气候效应。进一步分析得出：新仙女木事件在我国不同自然气候带呈单一的干冷降温效应，并作为多模式效应。

关键词：新仙女木事件 沙漠沉积 柴达木盆地

Zeng Yongnian. 1998. The record of Younger Dryas event in eolian sand deposit in Qaidam Basin. Arid Land Geography 21(1):25-28.

According to the environmental record and the areas of stratigraphy in the Xiaxitai section in the southeastern part of Qaidam Basin, this paper concludes that the desert development, formation of the cold-dry climate, evolution of the natural environment, and reverse changes have occurred frequently since the late glacial. In eolian sand deposits, the Younger Dryas event clearly appears, which manifests that it was a dry-cold climate period. Now there are two different opinions about the climatic effect of the Younger Dryas. According to our predecessors' research and the field work of the authors, it is considered that the Younger Dryas event not only exists in different climatic zones in China, but also manifests a unitary dry-cold climatic effect.

Keyword: Younger Dryas event, eolian sand deposit, Qaidam Basin

杨志荣，1998，大青山调角海子地区全新世低温波动研究，地理研究，17（2）：138-144

根据调角海子剖面寒冬现象的野外观测和测量、室内测年分析等资料，对调角海子地区全新世低温波动进行了探讨，并与邻近地区的多种研究资料进行了对比。经过初步研究认为，大青山调角海子地区一万年以来的低温波动主要有6次，时代分别为9100aB－8800aBP、8000aBP－7800aBP、7000aBP－6900aBP、6000aBP－5800aBP、5300aBP－4700aBP、和3100aBP－2400aBP，除了第2、4两次为弱低温波动，可能仅限于大青山地区外，其余均具有较广泛的区域意义；每次低温波动的极端低温较短，可能仅有50年-60
年，低温波动时年气温只比现在下降1°C-3°C。
关键词：大青山 全新世 低温波动

Yang Zhirong. 1998. A study on the low-temperature fluctuations since the Holocene in the Diaojiaohiazi Lake area, Daqingshan Mountains, Inner Mongolia. Geographical Research 17(2):138-144.

Based on field observation and measurement of periglacial phenomena, radiocarbon dating, and spore-pollen analysis of the samples from the Diaojiaohaizi section, this paper examines the low-temperature fluctuations in the Holocene in the Daqingshan Mountains. The research concludes: (1) There are six periods of low-temperature fluctuations in the Holocene including those in 9100 years BP-8800 years BP, 8000 years BP-7800 years BP, 7000 years BP-6900 years BP, 6000 years BP-5800 years BP, 5300 years BP-4700 years BP, and 3100 years BP-2400 years BP. These fluctuations have extensive regional signficance except the 2nd and the 4th fluctuations which are relatively weak and confined to the Daqingshan Mountians. (2) The characteristics of the sand wedge in the Diaojiaohaizi section indicates that the extreme low-temperature interval in the cold stage of the Holocene was short, which was only 50-60 years.

Keywords: Daqingshan Mountains, Holocene, low-temperature fluctuation

Climate Variation

*康世昌*等，1998，北极Svalbard地区气候变化特征及其与青藏高原对比，地理科学，18(4): 312-319

本文分析了Svalbard地区近80年来的气候变化，结果认为，其总趋势为缓慢变暖，但70年代后期降温，是全球升温的一个例外。另外，该地区与青藏高原气候变化存在着一定的相关性，但局地的气候变化原因导致了两地之间的某些差异。
关键词：Svalbard地区 青藏高原 气候变化

Kang Shichang et al. 1998. Characteristics of climatic change in Svalbard in the Arctic and comparison with the Qinghai-Xizang Plateau. Scientia Geographica Sinica 18(4):312-319.

Characteristics of climatic change in the Svalbard area in the last 80 years are analyzed in the article. It found a general warming trend. But a decreasing temperature since the mid-1970s in the Svalbard area is an exception in the background of global temperature rising. The study concludes that there is a good correlation in climatic change between the Svalbard area and the Qinghai-Xizang Plateau, and there are differences because of local climatic change.

Keywords: Svalbard area, Qinghai-Xizang Plateau, climate change

*郝永萍*等，1998，柴达木盆地东缘晚更新世气候变化的（古）土壤发生记录，地理科学，18(4): 249-254

本文根据柴达木盆地东缘晚更新世气候变化的（古）土壤及其黄土母质的宏观特征和理化分析揭示全球冰量影响的气候波动以及东亚季风气候的强弱变化特征。作者认为，气候变化过程中温度和降水并不同步。降水和低温是导致前5~3万年间气候相当湿润的重要原因。

关键词：土壤发生特征
气候变化信息 东亚夏季风增强
柴达木盆地 晚更新世

Hao Yongping et al. 1998. The characteristics of climatic fluctuation recorded by soil formation since the Late Pleistocene in the eastern region of the Qaidam Basin. Scientia Geographica Sinica 18(4):249-254.

Based on characteristics of soil macro-structure and physical-chemical analysis of samples from the Amgutan section in the eastern region of the Qaidam Basin, the authors studied climate fluctuations, which were affected by global ice and characteristics of the East Asia monsoon. The authors believe that temperature and precipitation in the climate system do not coincide with each other and precipitation and low temperature are important factors in the humid episode from 50 to 30 Ka BP.

Keywords: pedogenic properties, information of climatic fluctuation, East Asia summer monsoon enhancement, Qaidam Basin, Late Pleistocence

*金会军*等，1998，天山乌鲁木齐河源冰达坂多年冻土温度监测，冰川冻土，20(1)：25-29

本文对天山乌鲁木齐河源冰达坂天山山脉海拔最高（3,900m）的地温观测孔多年冻土温度的监测数据进行分析。结果表明，基岩温度呈现明显的昼夜、季节和年际变化，其中2m左右受山坡粗砾石中径流热扰动和降水热渗浸的强烈影响，地温年变化深度约在25-30m之间，0.5、1.0和2.0m处温度呈现明显升高趋势，而10和18m处地温缓慢下降。

关键词：冻土温度 气候波动 天山
冻土降温

Jin Huijun et al. 1998. Permafrost temperature in the ice pass at the source of the Urumqi River, Tianshan Mountains. Journal of Glaciology and Geocryology 20(1):25-29.

Permafrost temperature, measured in borehole no. 5 in the ice pass at the source of the Urumqi River [the highest (3,900 m a.s.l.) borehole in the Tianshan Mountains] since September 1991, was analyzed. The results of the temperature measurements indicate significant diurnal, seasonal, and annual variations. Strong influences from flowing water and percolation have been detected in a coarse gravel layer at a depth of about 2 m during autumn each year. The depth of annual temperature change is estimated down to 25 to 30 m. The ground temperature indicates a rising trend at the active layer and a cooling one at 10 and 18 m in the permafrost during the 5 year observation.

Keywords: permafrost temperature, climatic fluctuation, Tianshan Mountains, permafrost cooling

柯长青，李培基，1998，用EOF方法研究青藏高原积雪深度分布与变化，冰川冻土，20(1)：64-67

本文对青藏高原1963－1992年逐日积雪深度记录进行了EOF分析。结果表明，青藏高原积雪空间分布极不均匀，高原东部是高原积雪年际变化最显著的地区。从60年代到80年代积雪年际波动幅度有明显增加的趋势。

关键词：青藏高原 积雪深度 EOF分析 空间分布与变化

Ke Changqing and Li Peiji. 1998. Research on the characteristics of distribution and variation of snow cover on the Tibetan Plateau using EOF analysis. Journal of Glaciology and Geocryology 20(1):64-67.

Daily snow depth data from 1963 to 1992 over the Tibetan Plateau was analyzed by using the empirical orthogonal function (EOF) method. The results showed that the spatial distribution of snow cover over the Plateau is very inhomogeneous. The heavy snow cover region in the east of the Plateau is the region where the most significant inter-annual variation of snow cover occurs. There is an increasing trend of inter-annual fluctuation amplitude of snow cover over the plateau from the 1960s to 1980s.

Keywords: Tibetan Plateau, snow depth, EOF analysis, spatial distribution and variation

刘勇，邓晓峰，1998，希夏邦马峰－珠穆朗玛峰地区地貌与环境演化问题探讨，冰川冻土，20(1)：79-84

希夏邦马峰－珠穆朗玛峰地区是新生代以来，在欧亚板块与印度板块碰撞的地质背景下，迅速隆起的极高山地区。本文研究了该地区的地貌与环境演化问题，认为进入第四纪以来，强烈的构造隆升，使这些山地上的冰川进退、河流发育和湖泊变迁都发生了重大变化，带来整个地貌格局的变化。

关键词：冰期 环境演化 河流劫夺

Liu Yong and Deng Xiaofeng. 1998. An approach on the geomorphological and environmental development in the Xixiabangma–Qomolangma area. Journal of Glaciology and Geocryology 20(1):79-84.

The Xixiabangma–Qomolangma area has uplifted rapidly since the Cenozoic era, under the geological background of the collision of the Eurasia Plate with the Indian Plate. The geomorphological and environmental development is studied in the paper. With the dramatic tectonic uplift in the Quaternary, advance/retreat of glaciers, development of rivers, and change of lakes all underwent dramatic shifts and induced a change of the entire geomorphological pattern.

Keywords: glaciation, environmental evolution, capture of river

邓晓峰，刘勇，1998，希夏邦马峰北麓佩枯错湖堰塞成因的解释，冰川冻土，20(1)：85-87

本文研究了希夏邦马峰北麓佩枯错湖堰塞的成因，发现希夏邦马峰北麓第四纪不同时期的冰水相沉积物曾对门曲谷地有过不同程度的堰塞作用，从而提出了佩枯错湖为堰塞的成因。

关键词：佩枯错湖 堰塞成因 环境变迁

Deng Xiaofeng and Liu Yong. 1998. An explanation of the dam of the Peikucuo Lake at the northern foot of Mt. Xixiabangma. Journal of Glaciology and Geocryology 20(1):85-87.

The dam of the Peikucuo Lake at the northern foot of Mt. Xixiabangma is discussed in the paper. During the Quaternary, the glacio-fluvial deposition at the northern foot of Mt. Xixiabangma choked the Menqu River valley and formed Peikucuo Barrier Lake. Evolution of the lake corresponds to the change of glacier types from valley glacier and piedmont glacier to valley glacier.

Keywords: Peikucuo Lake, cause of damming, environmental evolution

潘安定，1998，青藏高原东北边缘第四纪孢粉及其环境，冰川冻土，20(2)：141-149

本文研究了青藏高原东北边缘第四纪孢粉记录及其环境演变。根据孢粉组合分析，早更新世早期是第四纪期间水热条件最为优越的时期。2.2 Ma B P 以来气候向干冷发展，1.8－1.77 Ma B P 湿润程度最高，1.7－1.6 Ma B P 前后，伴随黄土沉积出现，植被与环境发生历史性转折。

关键词：孢粉组合 第四纪 环境演化

Pan Anding. 1998. The Quaternary palynological record and environment at the northeast margin of the Tibetan Plateau. Journal of Glaciology and Geocryology 20(2):141-149.

The Quaternary palynological record and the evolution of the environment at the Northeast margin of the Tibetan Plateau are discussed in this paper. According to the spore-pollen assemblage analysis, 22 main and secondary cycles are recognized and the best humidity and temperate conditions appeared in the early Pleistocene during the Quaternary. The climate has become dry-cold since 2.2 Ma BP with the highest level of moisture between 1.8-1.77 Ma BP; a historic turning point occurred about 1.7-1.6 Ma BP together with the appearance of loess sediment.

Keywords: spore-pollen assemblage, Quaternary, environmental evolution

*张平中*等，1998，江西九江地区晚更新世生态变迁的土壤有机质碳同位素证据，冰川冻土，20(2)：150-156

本文对我国江西九江地区4个土壤剖面的土壤有机质及其 $\delta^{13}C$ 值进行分析，结果认为末次冰期旋回内生态转型是由于季风效应和 CO_2 共同作用的表现；北大西洋末次冰期内的Heinrich事件对中国东部的气候也产生剧烈的影响，其分布直接控制着 C_3 和 C_4 植物的转型及其沉积物的类型。CO_2 及其温室气体可能是Heinrich事件的重要驱动力。

关键词：碳同位素 土壤有机质 生态变迁 晚更新世 东南季风

Zhang Pingzhong et al. 1998. Carbon isotope evidence of the soil organic matter for the ecological variation during the Late-Pleistocence in the Jiujiang Region, Jiangxi Province. Journal of Glaciology and Geocryology 20(2):150-156.

The authors discuss soil organic matter content and $\delta^{13}C$ from four soil profiles in Jiujiang Prefecture, Jiangxi Province. The results indicate that the ecological shift in last glacial cycle was driven by the monsoonal effect and the change of CO_2 concentration. The North Atlantic Heinrich events also had dramatic impacts on the climate in eastern China, and their distribution directly controls the shift of C_3 and C_4 plants and type of sediments. The CO_2 concentration and other greenhouse gases may be one of the important factors forcing Heimrich events.

Keywords: carbon isotope, soil organic matter, ecological shift, Late Pleistocene, southeast monsoon

施淑燕，曹秋萍，1998，黑龙江省无霜期的气候变化，气象，24（1）：25-30

对黑龙江省的初、终霜日和无霜期按地区、年代进行了较详细的统计、分析。结果表明：60/70年代终霜较晚，初霜较早，无霜期较短；80年代以来，多数地区终霜日有所提前，各区及全省初霜日明显推后，无霜期延长，反映出了60、70年代较冷，80年代变暖，90年代前期持续变暖的气候特征。

关键词：无霜期 变化 分析

Shi Shuyan and Cao Qiuping. 1998. A climatic analysis of the frostless season in Heilongjiang Province. Meteorological Monthly 24(1):25-30.

The spatial and temporal variations of the frost seasons in Helongjiang Province were investigated. The main results are as follows: during the 1960s, the onsets of the frost seasons are earlier than normal, the ends of the frost seasons are later, and the frostless seasons are shorter. Since the 1980s the ends of the frost seasons have been earlier and their onsets are later in most parts of Heilongjiang Province, thus the frostless season is longer. These changes show that the climate was colder than normal before the 1970s, after which it changed to warmer.

Keywords: frostless seasons, variation, analysis

叶英，董波，1998，西北太平洋强热带气旋活动的年代际变化，气象，24（7）:29-34

统计分析了1951年-1995年西北太平洋强热带气旋活动的气候特征和大气环流特征及其相互关系。结果表明，50和60年代是强热带气旋活动的异常期，60和70年代是台风活动异常期。并指出台风与副热带高压、西风环流、青藏高原指数有很好的相关性。

关键词：强热带气旋 气候特征 大气环流 台风

Ye Ying and Dong Bo. 1998. Interannual change of severe tropical cyclone activities over the Northwest Pacific. Meteorological Monthly 24(7):29-34.

The climatic characteristics of severe tropical cyclone activities over the Northwest Pacific and general circulation features of the atmosphere and their relationship from 1951 to 1995 were statistically analyzed. The results show that the 1960s and 1970s were two periods of anomalous typhoon activities. Results also show that typhoons were well correlated with the subtropical high, the westerly circulation, and the Qinghai-Xizang Plateau index.

Keywords: severe tropical cyclone, climatic characterisic, atmospheric circulation, typhoon

陈隆勋，朱文琴，王文，1998，中国近45年来气候变化的研究，气象学报，56(3): 257-271

利用1951－1995年约400站的月平均气温、降水和1961－1995年200余站的最高和最低气温、相对湿度、总云量和低云量、日照时数、蒸发、风速和机学日数和深度以及0－3.2m共8层土壤温度等资料，对近45a来中国气候变化特征做了一个较全面的分析研究。

关键词：中国气候变化 气温和降水 最高和最低气温 相对湿度和日照

Chen Longxun, Zhu Wenqin, and Wang Wen. 1998. Study on climate change in China in recent 45 years. Acta Meteorologica Sinica 56(3):257-271.

Climate change and its characteristics in China in the last 45 years have been analyzed comprehensively on the basis of data of monthly mean air temperature and precipitation from 1951-1995 from about 400 stations, and from data on maximum and minimum air temperature, relative humidity, total cloud and low-cloud cover, sunshine duration, evaporation, wind speed, snow-covered days and depth, and soil temperatures in 8 layers from 0 to 3.2 m, from 200 stations from 1961-1995.

Keywords: climate change in China, air temperature and precipitation, maximum and minimum air temperature, relative humidity and sunshine

柯长青，李培基，1998，青藏高原积雪分布和变化特征，地理学报，53（3）：209-215

本文根据对青藏高原SMMR候积雪深度、NOAA周积雪面积、地面台站积雪深度进行了分析。结果表明青藏高原东西两侧多雪与腹地少雪形成鲜明的对比，高原东部是高原积雪年际变化最显著的地区，它主导了整个高原积雪的年际变化，并且与西部多雪区年际波动呈反位关系。从60年代到80年代积雪年际波动幅度有明显增加趋势，积雪变化具有3年左右的准周期。随着全球变暖，青藏高原积雪将会有增加。
关键词：青藏高原积雪 EOF分析 谱分析 空间分布与变化特征

Ke Changqing and Li Peiji. 1998. Spatial and temporal characteristics of snow cover over the Qinghui-Xizang Plateau. Acta Geographica Sinica 53(3):209-215.

In this paper, three complete Qinghai-Xizang Plateau snow cover data sets consisting of Scanning Multichannel Microwave Radiometer (SMMR) microwave pentad snow-depth maps, operational National Oceanic and Atmospheric Administration (NOAA) weekly snow cover extent charts, and daily snow-depth data at 60 primary weather stations covering 36 years were used to investigate the spatial and temporal characteristics of snow cover on the Qinghai-Xizang Plateau. The empirical orthogonal function (EOF) method and spectral analysis, as well as trend estimate analysis, were used in the study. The results show that the spatial distribution of snow cover over the Qinghai-Xizang Plateau evidently compares with the light snow cover in the vast interior of the Qinghai-Xizang Plateau. The heavy snow cover region in the east of the Qinghai-Xizang Plateau is the most significant region of the interannual variation of snow cover on the Qinghai-Xizang Plateau and dominates the interannual variation of snow cover in the whole Plateau. There is an opposite phase relationship between the western parts and the eastern parts of the Qinghai-Xizang Plateau in the interannual fluctuation of snow cover from the 1960s to the 1980s.

Keywords: snow cover on the Qinghai-Xizang Plateau, EOF analysis, spectral analysis, characteristics of spatial distribution and variation

袁玉江，1998，塔克拉玛干地区近四十年的干湿变化，干旱区地理，21（1）:18-24

利用塔克拉玛干、周围山区、及相邻地区的48个气象站近40年的降水资料，分析塔克拉玛干地区年与四季干湿变化的阶段与周期，并与周围山区及相邻地区进行相关性分

Yuan Yujiang. 1998. The wet-dry change in recent 40 years in the Taklimakan Desert area. Arid Land Geography 21(1):18-24.

Using the precipitation data for the last 40 years from 48 meteorological stations in the Taklimakan Desert, surrounding mountains and neighboring areas, the stages and periods of the wet-dry changes in annual precipitation and four seasons in the Taklimakan area are analyzed. The correlation of precipitation change in the Taklimakan Desert and in surrounding mountains

析，探讨其与极涡位置的关系。
关键词：塔克拉玛干地区 干湿变化

and the wet-dry change in the Taklimakan area is compared and some statistical conclusions are made.

Keywords: Taklimakan area, wet-dry change

姜逢清，1998，新疆气候与环境的过去、现在及未来情景，干旱区地理，21（1）：1-9

在分析近年来新疆地质时期与历史时期气候与环境研究方面大量文献资料与成果，并对现代器测时期的气候变化问题进行讨论的基础上，利用综合分析法构画了新疆下世纪上半叶气候与环境的可能情景，认为新疆气候与环境初建于晚白垩世，主要形成于第三纪，至今总的干旱情势并未改变。但在漫长的地质时期中也存在过由于气候波动而出现冷暖与干湿的变化。预计下世纪上半叶新疆干旱的总格局不会改变，但比目前会略显湿润，气温将略有增加，此后会向百年尺度冷的方向发展。
关键词：新疆 气候与环境 气候情景

Jiang Fengqing. 1998. Studies in past climate and its possible trends in Xinjiang. Arid Land Geography 21(1):1-9.

A review of the past climate and environment in Xinjiang classifies the studied period into three different time scales (i.e., geological, historical, and instrumental) and analyzes the characteristics of past climate and the environment in Xinjiang and then predicts trends. It concludes that the arid condition in Xinjiang has remained since the early age of the Tertiary. However, climate and environmental variations that were characterized by dry-damp and cold-warm alternation have taken place during this long time. Periods of climate and environmental variation, such as 100 and 1000 years, are clearly found. By prediction, the arid condition in Xinjiang will continue into the middle of the next century. The air temperature will rise slightly in winter and decrease in summer. The precipitation will increase a little.

Keywords: Xinjiang, climate and environment, climate trend

*袁玉江*等，1998，塔克拉玛干地区近40年来的冷暖变化，中国沙漠，18（2）：118-122

利用塔克拉玛干、周围山区、及相邻地区的48个气象站近40年的温度资料，分析塔克拉玛干地区年与四季冷暖变化的阶段、周期、趋势，比较与周围山区及相邻地区的相关性，探讨与其欧亚环流指数的关系

Yuan Yujiang. 1998. Temperature variation in the recent 40 years in the Taklimakan area. Journal of Desert Research 18(2):118-122.

Using the temperature data for the last 40 years from 48 meteorological stations, the paper analyzes the stages, periods, and trends of temperature change. The author also compares the temperature change in the Taklimakan area with that of the surrounding mountains and adjacent areas, and discusses the relationship between the Euroasian circulation index and temperature change in the studied area. The results are as

，得到5点统计结论：（1）区域平均温度序列对该区的冷暖变化具有较好的代表性；（2）区域平均温度序列具有各自不同的冷暖阶段及变化周期，其中年温与冬温具有显著的变暖趋势，且变暖的幅度冬季约为年的3倍；（3）与周围山区站的相关性，以托云同步较好；（4）与相邻地区温度变化的相关性，以甘肃为最好；（5）年温变化与欧亚年平均经向环流指数具有显著的负相关性，其秋季温度与10—11月份的纬向环流指数具有显著的正相关性。

关键词：塔克拉玛干地区 现代冷暖变化 相邻地区 比较

follows: (1) The annual and seasonal mean temperature sequences of this area reflect the warm-cold changes in the area. (2) The annual and seasonal temperature changes have different warm-cold stages and change periods. The temperature changes annually and in winter shows a significant warming trend, and the changing range in winter is about three times as much as that of the annual range. (3) The correlation of the temperature change in the Taklimakan area with that from the surrounding mountains and adjacent area is better at the Toyun station. (4) The correlation of the temperature change in the Taklimakan area with that of the adjacent area is best at Gansu Province. (5) There is a significant negative correlation between annual temperature change in the Taklimakan area and the Euroasian annual mean longitudinal circulation index, and significant positive correlation between autumn temperature change and latitudinal circulation index from October to November.

Keywords: Taklimakan area, modern warm-cold change, adjacent areas, comparision

*阎满存*等，1998，腾格里沙漠东南缘沙漠演化的初步研究，中国沙漠，18（2）：111-117

根据不同地貌单元地层沉积相组合、典型剖面热释光和^{14}C测年以及粒度、孢粉和化学元素等资料的分析，重建了腾格里沙漠东南缘沙漠演化的过程。进而讨论了沙漠演化与冰期气候波动和东亚季风环流盛衰变化的耦合关系。

关键词：腾格里沙漠 地层沉积相 沙漠演化模式

Yan Mancun et al. 1998. A preliminary study on the evolution of the southeastern margin in the Tengger Desert. Journal of Desert Research 18(2):111-117.

The desert evolution in the southeast margin of the Tengger Desert was reconstructed. The reconstruction shows the southeastern margin of shifting sand, the spread or fixation, semi-fixation and reduction of the desert to grassland as well as weak pedogenic processes since the middle Pleistoncene. Simultaneously, the bioclimatic zones in the area underwent alternations from dry, cold and windy desert, and desert steppe to semi-arid steppe, semi-arid or semi-humid sparsely wooded steppe. The processes of evolution are controlled by the coupling between the glacial and interglacial climate fluctuation and the prosperity and decline of the eastern Asian monsoon.

Keywords: Tengger Desert, sedimentary facies, desert evolution model

陆日宇，黄荣辉，1998，东亚－太平洋遥相关型波列对夏季东北亚阻塞高压年际变化的影响，大气科学，22（5）：727-734

利用1980－1988年9年的观测资料，分析了夏季东北亚阻塞高压的年际变化及其与江淮地区夏季降水之间的关系，指出夏季东北亚阻塞高压具有十分明显的年际变化，同时它与江淮地区夏季降水之间存在着较密切的关系：当夏季东北亚阻塞高压频发时，江淮地区降水偏多；而当夏季东北亚阻塞高压维持日数少时，江淮地区降水偏少。为考察产生上述结果的原因，我们分析了全球海温异常，并利用合成的热带西太平洋海温异常每年研究了热带西太平洋海温异常对东北亚阻塞高压形成和维持的影响。最后指出热带西太平洋海温异常引起的东亚－太平洋型遥相关波列是产生夏季东北亚阻塞高压的年际变化加强及其与江淮地区夏季降水之间关系的一个重要原因。

关键词：东亚－太平洋遥相关型　东北亚　阻塞高压　海温异常

Lu Riyu and Huang Ronghui. 1998. Influence of East Asia/Pacific teleconnection pattern on the interannual variations of the blocking highs over northeastern Asia in the summer. Scientia Atmospherica Sinica 22(5):727-734.

The interannual variations of the blocking highs over northeastern Asia in summer and their relationship to precipitation over the Yangtze River and Huaihe River basin in summer are analyzed with the 1980-1988 European Centre for Medium-Range Forecast (ECMRF) data. The results show that the blocking highs over northeastern Asia in summer have obvious interannual variations. The results also show that there is a close relationship between blocking highs over the northeastern Asia and the precipitation over the Yangtze River and Huaihe River basin. When blocking highs occur frequently over northeastern Asia in summer, the precipitation over the Yangtze River and Huaihe River basin is higher than normal. And when blocking highs seldom occur, the precipitation is less than normal. To investigate the causes of these results, we analyzed the sea surface temperature (SST) anomalies and simulated the influence of the SST anomalies in the tropical western Pacific on the blocking highs over the northeastern Asia, using the composite SST anomalies. Results show that the East Asia/Pacific teleconnection pattern, which is caused by the SST anomalies in the tropical western Pacific, is one of the important causes of the interannual variations of the blocking highs over northeastern Asia in summer and is related to summer precipitation over the Yangtze River and Huaihe River basin.

Keywords: East Asia/Pacific teleconnection pattern, blocking highs over northeastern Asia, sea surface temperature anomalies

*钱云*等，1998，末次冰期东亚区域气候变化的情境和机制研究，大气科学，22（3）：283-293

用一嵌套在全球大气环流模式中的区域气候模式，通过熟知试验和对内外因作用的机制分析，探讨了一

Qian Yun et al. Study on scenarios and mechanism of the regional climate change of East Asia in the Last Ice Age. Scientia Atmospherica Sinica 22(3):283-293.

The scenarios and mechanism of regional climate change over East Asia in the Last Ice Age, which are affected by large-scale circulation background and local mesoscale forcings, are discussed by

末次冰期为背景的大尺度强迫引起的大气环流和区域内下垫面条件异常等中尺度强迫影响区域气候变化的过程很好机制。大尺度强迫和区域内局地的中尺度强迫通过不同的热力和动力学过程影响大气运动状况和区域气候的变化。末次冰期大尺度强迫引起的全球大气环流背景的变化是形成冰期和现代区域气候差异的主要原因。

关键词：末次冰期 区域气候
大尺度环流背景 中尺度局地强迫

dynamic analysis and numerical simulations using a regional climate model and a general circulation model (GCM). The comparison between the simulated and the observed shows that results simulated by the regional model indicate more details and are closer to the evidences of geological data than results simulated by a GCM. The effects of large-scale forcing on regional climate change are mainly through the propagation of stationary wave trains and teleconnection, whereas the mesoscale forcing in the domain is mainly through local thermal and dynamic processes of the atmosphere. In the climate system, changes of one of the independent factors may touch off a positive or negative feedback process and influence other climate variables to various degrees.

Keywords: Last Ice Age, regional climate, general circulation background, local mesoscale forcing

辛国君，梁福明，1998，太阳常数的微小变化在气候变化中的作用，大气科学，22（3）：318-325

将复杂的气候系统抽象为含有云辐射动态反馈过程的高度非线性气候模型，利用分岔理论，分析了该模型的平衡态及其稳定性。计算结果表明，云反照率反馈、地表反照率反馈和水汽反馈是气候系统呈现多平衡态结构的主要因素，是气候变化复杂性的根源，而云放射率反馈对系统结构的影响，只有在强烈的水汽放射率反馈条件下才表现明显。较强的地表反照率反馈和水汽放射率反馈，均可在太阳常数仅有微小变化时就能导致全球气候变化。

关键词：平衡态 稳定性 气候反馈
气候突变 太阳常数

Xin Guojun et al. 1998. Effect of slight change in the solar constant on the climate. Scientia Atmospherica Sinica 22(3):318-325.

A new three-component time-dependent climate model is established. The model consists of three equations that respectively govern the change of annual mean global surface temperature, atmospheric temperature, and cloud amount. The steady states and stability of the climate model with change in the solar constant are investigated using the bifurcation theory. The model results show that the cloud and snow-ice albedo feedbacks and the water vapor emissivity feedback may lead to multiple stable climate states, and thus show the complexity of climatic variation. Only under the condition of a strong water vapor emissivity feedback, can the cloud emissivity feedback change the structure of the climate system noticeably. The strong snow-ice feedback and water vapor emissivity feedback can lead to sudden global climate change, although the solar constant has slight changes within the 1% range.

Keywords: steady state, stability, climate feedback, climate jump change, solar constant

任福民，翟盘茂，1998，1951～1990年中国极端气温变化分析，大气科学，22（2）：217-227

利用中国1951－1990年极端温度资料，在消除台站迁移和城市热岛效应的影响，并经过资料质量控制的基础上，对我国极端温度的变率和变化趋势的区域分布以及季节变化特征进行了分析研究。结果发现，近40年中国季极端最低温度的变率以春、秋两季为最大，大变率区域主要集中在北方；夏季是极端最低温度变率最小的季节。

关键词：中国 极端温度 变化

Ren Fuming, Zhai Panmao, et al. 1998. Study on changes of China's extreme temperatures during 1951-1990. Scientia Atmospherica Sinica 22(2):217-227.

This paper mainly studies the spatial and temporal distribution of variability and trends for extreme temperatures based on China's extreme temperature data during 1951-1990. Efforts are made to minimize the possible biases caused by changed locations of stations and the urban heat island effect, and to perform quality control procedures. The results show that the variability of extreme minimum temperature in most parts of China in spring and autumn is greater than those in other seasons, especially in northern China.

Keywords: China, extreme temperatures, change

高登义，武炳义，1998，北半球海－冰－气系统的10年振荡及其振源初探，大气科学，22（2）：137-144

采用最大熵谱方法分析了1953－1990年间冬季喀拉海、巴伦支海海冰面积指数、西伯利亚高压强度指数、东亚冬季风强度指数的变化周期，并把冬季喀拉海、巴伦支海海冰面积变化与翌年春夏各季节副热带高压的特征量指数（包括面积指数、强度指数）变化进行了比较。研究发现在海冰－大气系统中，明显存在10年尺度周期性变化；冬季喀拉海、巴伦支海海冰面积变化与西伯利亚高压强度指数、东亚冬季风强度指数均呈现相反的变化趋势，海冰偏多（少）则西伯利亚高压偏弱（强）；冬季海冰面积变化与来年的春夏各季节副热带高压的范围、强度均呈现相同的变化趋势，

Gao Dengyi and Wu Bingyi. 1998. Preliminary study on decadal oscillation and the oscillation source of the sea-ice-air system in the Northern Hemisphere. Scientia Atmospherica Sinica 22(2):137-144.

The variation periods of the sea-ice area index in the Kara/Barents Seas, the intensity index of the Siberian High and the winter monsoon over East Asia during the winters of 1953-1990 were analyzed using maximum entropy and band-pass filter methods. The sea-ice area variation in winter in the Kara/Barents Seas was compared with the area and intensity indices of the subtropical high in the following spring and summer. These analyses show that there is an obvious decadal variation in the sea-ice-air system in the Northern Hemisphere. And the variations of intensity index of the winter Siberian High and winter monsoon over East Asia are out of phase with that of sea-ice area in winter in the Kara/Barents Seas. The more (less) sea ice there is, the weaker (stronger) the winter Siberian High and winter monsoon are; the variation trend of sea-ice area is similar to that of the area and the intensity of the subtropical high in the coming spring and summer with a lag period of 0~1 year for the latter. The decadal oscillation sources in the atmosphere are closely linked to some sea regions. The center of the strongest

并且海冰变化要超前0～1年；复经验正交分析表明大气10年尺度周期性变化的振荡源分布均与某海区（洋区）有关，大气10年尺度变化是对海洋（海冰）变化的响应。
关键词：海冰 10年振荡 振源 副热带高压

oscillation source excited by winter sea ice in the Kara/Barents Seas is near 70° E, 60° N.

Keywords: sea ice, decadal oscillation, oscillation source, subtropical high

*李金龙*等，1998，北半球夏季环流持续性异常及其发展特征，大气科学，22（1）：57-65

利用美国国家气象中心（NMC）的1957--1979年夏季500hpa位势高度场，分析了热带外地区环流持续性异常。夏季持续性环流相当活跃，但异常（≥40m）的持续时间小于一个月。不同地区的持续异常极少能同时存在，主要表现为单独发生。持续异常具有遥相关结果，它们在相当尺度上同冬季遥相关型相似。持续异常建立过程中主要中心强度增长相当快，振幅加倍时间约为2天。持续异常的建立，对最优扰动的发展具有重要作用。
关键词：夏季环流 持续异常 发展过程

Li Jinlong et al. 1998. Persistent anomalies in the Northern Hemisphere during summer time and characteristics of their development. Scientia Atmospherica Sinica 22(1):57-65.

An analysis of persistent anomalies in the extra-tropical areas is presented based on the data of 500 hPa potential height of 23 years from 1957 to 1979 from the American National Meteorological Center. Persistent anomalies are considerably active in summer, but the duration of the anomalies larger than 40 m is less than one month. Persistent anomalies in different geographical regions are unlikely to coexist, and their structures are characterized by teleconnection patterns, which resemble those in winter. In the formation process of persistent anomalies, the intensity of main centers of perturbation increases with large growth rates in which the time of doubling intensity is about 2 days. This suggests that optimal perturbations play a crucial role in the development of persistent anomalies.

Keywords: summer current, persistent anomaly, developing process

吴尚森，梁建茵，1998，南海西沙地区季风季节变化的气候特征，大气科学，22（5）：771-778

利用位于南海中北部的西沙观测站1959－1988年30年常规地面观测资

Wu Shangsen and Liang Jianyin. 1998. Seasonal evolution of climatic characteristics of summer monsoon over the Xisha area. Scientia Atmospherica Sinica 22(5):771-778.

In this study, the 30-year (1959-1989) conventional surface observations and the 9-year (1980-1988) radiosonde data at Xisha station

料和1980－1988年9年探空资料，分析了西沙地区季风季节变化气候特征。30年的地面观测资料平均结果表明，西沙地区5月中旬西南（或南）风建立，对流突然加强，云量陡增，6月上旬降水量剧增。利用本文定义的季风指数，可以将西沙夏季风季节变化过程分为3个阶段：东南夏季风阶段（4月初至五月初）、西南夏季风阶段（5月中至9月初）和夏季风结束阶段（9月中至10月初）。这种阶段的划分不但与广东省汛期降水有较好的对应关系，而且与南海大气环流的季节演变也有很好的联系。

关键词 西沙地区 季风 季节变化 气候特征

located in the mid-northern part of the South China Sea were used to analyze the annual evolution of the summer monsoon at Xisha. The analyzed results show that the southwest wind (or south wind) at Xisha prevails in the middle of May, the convection and cloud amount increase suddenly at the same moment, and rainfall increases greatly in early June. Using the monsoon indices 1 and 2 proposed by us, the annual evolution of the summer monsoon can be divided into three phases: The southeast monsoon phase (from early April to early May), the southwest monsoon prevailing phase (from mid-May to early September), and the ending phase (from mid-September to early October). These phases are associated with both the seasonal precipitation variations in Guangdong and the annual evolution of atmospheric circulation over the South China Sea.

Keywords: Xisha area, monsoon, seasonal evolution, climatic characteristics

Historical Climate

陈家其，姜彤，许朋柱，1998，江苏省近两千年气候变化研究，地理科学，18(3)：219-226

本文建立了长度在600~1800a间的一个温度指数序列和苏南、苏北两个旱涝等级序列。分别对历史气候时期(近2000a)和实测资料时期(近百年)的温度和降水变化规律做研究，提出宏观趋势。

关键词：江苏省 最近2000年 气候变化

Chen Jiaqi, Jiang Tong, and Xu Pengzhu. 1998. Climatic change during the last 2000 years in Jiangsu Province. Scientia Geographica Sinica 18(3):219-226.

One series of temperature indexes and two series of flood/drought data in the north and south of Jiangsu Province are available for the period 600 to 1,800 a. The authors studied the variation of temperature and precipitation during the last 2000 years and the most recent hundred years, respectively. The general tendency is presented.

Keywords: Jiangsu Province, last 2000 years, climatic change

张德二，陈永林，1998，由我国历史飞蝗北界记录得到的古气候推断，第四纪研究，1998(1)：12-19

本文利用我国古代有关飞蝗的文献记录，研究了我国古气候特征。推断出飞蝗发生在我国北纬41° 以北地区的年份的气温条件，指出1162～1177年、1265～1280年和1763~1773年是我国东北地区气候温暖的时段。

关键词：飞蝗 历史气候记录 古气候推断

Zhang De'er and Chen Yonglin. 1998. Paleoclimate inferred from the Chinese historical records of the northern boundary of the migratory locust. Quaternary Sciences 1998(1):12-19.

Based on data of historical records about insects, characteristics of historical climate are researched by the authors. The research points out the temperature condition of the locust generated at the north of 41° N. And it is also concludes that the periods of 1162-1177, 1265-1280, and 1763-1773 were warm periods in northeastern China.

Keywords: *Locusta migratoria*, historical climate record, paleoclimate inference

满志敏，1998，关于唐代气候冷暖问题的讨论，第四纪研究，(1): 20-30

本文根据历史资料讨论了唐代气候冷暖两方面的证据。从资料看来，唐代气候温暖的证据难以确定相应的气候因子。但其冷期可分为两大阶段，8世纪50年代以前大体与现代相差不大，8世纪60年代以后气候变冷，某些时段寒冷的特征可与明清小冰期相似。

关键词：历史气候 气候变化 隋唐气候

Man Zhimin. 1998. Climate in the Tang Dynasty of China: Discussion of its evidence. Quaternary Sciences (1):20-30.

Based on data from the historical record, the author discusses evidence of warm and cold periods during the Tang Dynasty. According to records, there is no firm evidence of a warm period. The cold period can be divided into two parts: the climate before the middle of the 8th century is not markedly different from now, and in the period of the Tang Dynasty after the middle of the 8th century, the climate was cold.

Keywords: historical climate, climate change, climate in Sui-Tang period

吴宏岐，党安荣，1998，隋唐时期气候冷暖特征与气候波动，第四纪研究，(1): 31-38

本文根据物候、动物分布、孢粉、雪线和海平面等相关资料，对隋唐

Wu Hongqi and Dang Anrong. 1998. Fluctuation and characteristics of climate change in temperature of the Sui-Tang times in China. Quaternary Sciences (1):31-38.

Based on relevant materials, such as phonological phenomena, distribution of animals, spore and pollen, snow line, and sea level, the authors

时期气候冷暖特征进行了深入研究，重新肯定了竺可桢关于中国近五千年来气候变迁研究的基本结论。同时对隋唐温暖期的起始年代作了修正，并对该时期气候波动作出探讨。

关键词：隋唐时期 气候变化特征 气候波动

studied warm and cold characteristics of climate in the Sui-Tang period. Professor Zhu Kezhen's results for the recent 5,000 years of climate changes in China is confirmed. Furthermore, the beginning time of a warm period in Sui-Tang times is revised, and the fluctuation of climate change in this period is also discussed in detail.

Keywords: Sui-Tang times, characteristics of climate change, fluctuation of climate

蓝勇，1998，近2000年来长江上游荔枝分布北界的推移与气温波动，第四纪研究，(1): 39-45

本文通过对近2000年来长江上游荔枝分布北界变化的讨论，证明近2000年来荔枝种植的北界是逐渐向南退缩的。这说明12世纪的寒冷气候是长江上游近2000年来最寒冷的时期；在12世纪中长江上游又以70年代最为寒冷。

关键词：长江上游 荔枝 分布北界

Lan Yong. 1998. The movements of the northern boundary of litchi distribution and fluctuations of temperature in the upper reaches of the Yangtze River in the past 2000 years. Quaternary Sciences (1):39-45.

Through the discussion of the changes of litchi distribution in the upper reaches of the Yangtze River, the author concludes that the northern boundary of litchi distribution has been moving slowly to the south of China. This indicates that the cold weather of the 12th century was the coldest period during the recent 2,000 years. The 1170s were the coldest period of these times in the upper reaches of Yangtze River.

Keywords: upper reaches of the Yangtze River, litchi, northern boundary of litchi growing

邓辉，1998，论燕北地区辽代的气候特点，第四纪研究，(1): 46-53

本文根据《辽史》中有关旱、涝、冻记录，分析了辽代燕北地区的气候特征。结果表明，辽代燕北地区的干湿变化过程中，早期以干为主，中、晚期以湿为主，1080年前后为气温下降时期，比黄淮海地区的同期变化要早约30年。

关键词：辽代 燕北地区 气候变化

Deng Hui. 1998. Reconstruction of climatic series of the North Yanshan Mountain Region in Liao Dynasty. Quaternary Sciences (1):46-53.

According to analysis of the records of drought, flood, and the extreme low temperature in the Liao Historical Book, the author studied the climatic characteristics in the North Yanshan Mountain Region in the Liao Dynasty. The results show that in the earlier periods of that time the climate was drier and in the middle and late periods of that time, the climate was mainly wet.

Keywords: Liao Dynasty, North Yanshan Mountain Region, climatic series

*王绍武*等，1998，中国小冰期的气候，第四纪研究，(1): 54-63

本文在建立了近百年中国10个区的年平均气温序列的基础上，利用史料、冰芯记录及树木年轮，重建了各区近400~1000年的10年平均气温序列。分析表明，近千年来中国可能有5次冷期分别出现于1100s－1150s, 1300s－1390s, 1450s－1510s, 1560s－1690s及1790s－1890s。
关键词：小冰期 气候变化

Wang Shaowu et al. 1998. Climate in China during the Little Ice Age. Quaternary Sciences (1):54-63.

Based on the construction of an annual temperature series of the past 100 years for each of 10 regions of China, a mean temperature series of 400-1000 years for each region is reconstructed using data of historical records, ice-core records, and tree-ring records. Results of analysis show that there are five cold periods for the recent 1000 years. They are 1100s-1150s, 1300s-1390s, 1450s-1510s, 1560s-1690s and 1790s-1890s.

Keywords: Little Ice Age, climate change

李平日，曾昭璇，1998，珠江三角洲五百年来的气候与环境变化，第四纪研究，(1): 65-70

本文根据史籍资料和香港近五百年的气温记录，探讨了珠江三角洲1488－1893年的小冰期和其后进入现代暖期的气候变化。作者认为珠江三角洲的小冰期开始于1488年，结束于1893年。另外，作者还预测了下世纪全球变暖、海平面上升对珠江三角洲的可能影响。
关键词：珠江三角洲
气候与环境变化

Li Pingri and Zeng Zhaoxuan. 1998. On the climatic and environmental changes in the Pearl River Delta during the last 500 years. Quaternary Sciences (1):65-70.

The characteristics of climatic changes of the Little Ice Age in 1488-1893 and recent warm period are discussed in the paper based on the historical data of occurences of frosty weather in the Pearl River Delta during the last 500 years. The authors recognize that the Little Ice Age began in 1488 and ended in 1893 in the Pearl River Delta. The authors also forecast the possible effects on Pearl River Delta caused by global warming and a rise in sea level.

Keywords: the Pearl River Delta, climatic and environmental change

王守春，1998，塔里木盆地三大遗址群的兴衰与环境变化，第四纪研究，(1): 71-79

本文研究了塔里木盆地中的三大遗址群的兴起、兴盛和发展，以及废弃。作者认为，气候变化是导致它

Wang Shouchun. 1998. The abandonment of three major ancient ruins groups and environmental change in the Tarim Basin. Quaternary Sciences (1):71-79.

The occurrence, development, flourishing, and abandonment of three ruins groups in the Tarim Basin are studied in the paper. The author believes that climatic changes caused the abandonment of

们灭亡的共同原因。因此，导致水资源条件变化的原因是气候变化，而不是人为因素。
关键词：楼兰遗址 尼雅遗址 克里雅遗址 环境变化

the ruins groups. Therefore, global change of climate induced the variation of water sources, with little connection to the human factors.

Keywords: Loulan Ruins, Niya Ruins, Keria Ruins, environmental change

*刘嘉麒*等，1998，人类生存与环境演变，第四纪研究，(1): 80-85

Liu Jiaqi et al. 1998. Existence of human and environmental changes. Quaternary Sciences (1):80-85.

人类起源和生存与全球环境演变密切相关，人类在自然环境中诞生并适应环境变化而生存。但过度的开发环境会造成环境恶化，进而给人类带来种种灾难，促使人类迁移，引起民族战争和社会动荡。人类只有协调好与环境的相互关系才能得以生存。
关键词：人类 环境

The evolution and existence of human beings are closely related to global environmental change. Human beings evolved from nature and continue to exist by adapting to it. But excessive consumption of the environment can cause serious environmental problems and lead to disasters for mankind, such as migration, war, and social upheaval. Modern humans should enter a new stage: humans in harmony with the nature.

Keywords: mankind, environment

Impact

*张寅生*等，1998，我国大陆型山地冰川对气候变化的响应，冰川冻土，20(1)：3-8

Zhang Yinsheng et al. 1998. The response of continental-type glacier to climate change in China. Journal of Glaciology and Geocryology 20(1):3-8.

本文探讨了青藏高原冰川变化的能量机制，发现物质平衡线高程（ELA）与气候波动呈线性相关。作者还建立了研究和预测ELA的模型，得到了在不同气候变化情况下，冰川平衡线对气候因子波动的响应值，并预测了未来气候变化对青藏高原冰川物质平衡过程的影响。
关键词：冰川变化 气候波动 响应

The energy mechanisms for glacier fluctuation in the Qilian Mountains are discussed. It is found that the mass equilibrium line altitude (ELA) has linear correlation with climate change. A model is developed to study and forecast the ELA. From this model, the ELA response to climatic factors under different future climatic scenarios can be obtained. The future effects of climate change on mass balance are also forecasted.

Keywords: glacier variation, climate change, response

*刘时银*等，1998，天山乌鲁木齐河源1号冰川物质平衡对气候变化的敏感性研究，冰川冻土，20(1): 9-13

本文应用度日物质平衡模式对天山乌鲁木齐河源1号冰川物质平衡对气候变化的敏感性进行了研究。结果表明，乌鲁木齐河源**1**号冰川物质平衡对气候变化的敏感性要小于海洋冰川。此外，气温与降水在物质平衡形成过程中的作用是不同的，气温引起物质平衡剖面以旋转方式变化，而降水可导致其平移方式的响应。

关键词：1号冰川 物质平衡
平衡线高度 敏感性

Liu Shiyin et al. 1998. Mass balance sensitivity to climate change of Glacier No. 1 at the Urumqi River Head, Tianshan Mountains. Journal of Glaciology and Geocryology 20(1):9-13.

A degree-day mass balance model is applied to the sensitivity test of mass balance/equilibrium line altitude (ELA) to detect climate change of Glacier No. 1 at the Urumqi River Head, Tianshan Mountains. Results demonstrate that the mass balance of Glacier No. 1 is less sensitive than that of a maritime type glacier. In addition, air temperature and precipitation play different roles in mass balance (i.e., elevation-dependent mass balance follows the temperature variation by means of rotation against the elevation axis and it shifts parallel to precipitation change).

Keywords: Glacier No. 1 at the Urumqi River Head, mass balance, equilibrium line altitude (ELA), sensitivity

*王宁练*等，1998，近1500年来古里雅冰芯中NO_3^-浓度变化及其环境意义，冰川冻土，20(1)：14-20

本文研究了近1500年来古里雅冰芯中浓度变化及其环境意义。作者认为太阳活动、平流层N_2O氧化和陆源气团是NO_3^-的主要来源。其中太阳活动是古里雅冰芯中NO_3^-浓度变化的主要控制因子，两者的长期变化趋势呈现明显的正相关关系。

关键词：古里雅冰芯 NO_3^-浓度
太阳活动

Wang Ninglian et al. 1998. Variation and environmental implication of nitrate concentration in the Guliya ice core in the recent 1,500 years. Journal of Glaciology and Geocryology 20(1):14-20.

The variation and environmental implications of nitrate concentration in the Guliya ice core in the recent 1,500 years are studied in the paper. Solar-induced oxidation of nitrous oxide in the stratosphere and continental air mass is found to be the major source of NO_3^- in the Guliya ice core. And solar activity is a major factor in controlling the variation of NO_3^- concentration in the ice core. The secular variation of solar activity and NO_3^- concentration show a remarkable positive correlation.

Keywords: Guliya ice core, NO_3^- concentration, solar activity

*刘光秀*等，1998，西昆仑山甜水海24万年以来生态环境演化的孢粉学证据，冰川冻土，20(1)：21-24

本文研究了西昆仑山甜水海24万年以来生态环境演化的孢粉学证据。分析结果认为，本地区240KaBP以来，高寒荒漠植被一直占主导地位，但其间有草原成分蒿增加的若干波动，它反映了寒冷干旱气候背景下的湿润温和波动和生态环境的脆弱性。依据钻孔孢粉组合特征及蒿藜比值划分出的10个带，代表了气候环境的10次波动。

关键词：生态环境 孢粉纪录
甜水海 西昆仑山

Liu Guangxiu et al. 1998. Palynological evidence of ecological environmental change since 240 ka BP for Tianshuihai Lake, West Kunlun Mountains. Journal of Glaciology and Geocryology 20(1):21-24.

Palynological evidence of ecological environmental change since 240 ka BP for Tianshuihai Lake in the West Kunlun Mountains is discussed. Analysis indicates that alpine desert vegetation has been dominant since 240 ka BP in this region, but there have been several fluctuations of *Artemisia,* the main component of the steppe environment, reflecting that there have been several warmer and wetter intervals under the cold and dry climate background. According to the changes of pollen type and the ratio of *Artemisia* and Chenopodiaceae (A/C), the pollen record can be divided into 10 zones, showing 10 climatic fluctuations and an ecological environmental fragility in this area.

Keywords: ecological environment, pollen record, Tianshuihai Lake, West Kunlun Mountains

*任贾文*等，1998，气候变暖使珠穆朗玛峰地区冰川处于退缩状态，冰川冻土，20(2)：184-185

采用GPS技术对冰川末端位置进行了测量，并将1996年和1997年的结果对比，发现过去30年间该冰川末端后退了170－270m，平均年退缩量为5.5－8.7m。由于目前气候仍在变暖，该冰川将继续保持退缩状态。

关键词：冰川后退 气候变暖
珠穆朗玛峰

Ren Jiawen et al. 1998. Climatic warming causes the glacier retreat in Mt. Qomolangma. Journal of Glaciology and Geocryology 20(2):184-185.

The Rongbuk Glacier was investigated and its terminus location was measured by means of global positioning system (GPS) techniques. Comparison of the 1997 and 1996 measurements shows that in the past 30 years the glacier has retreated 170-270 m, equivalent to a retreat speed of 5.5 to 8.7 m/a. This suggests that the climate in the region has mainly been warming since the early part of this century and that the glacier will continue retreating.

Keywords: glacier retreat, climatic warming, Mt. Qomolangma

*肖扬*等，1998，气候变化对森林生态系统的影响及研究对策，中国农业气象，19（1）：20-25

在系统地分析和讨论全球气候变化背景的基础上，全面介绍了我国近年来气候变化研究方面的主要成果，探讨了我国未来气候变化的可能情景，重点分析了气候变化对森林生态系统初级生产力、地理分布格局、组成结构和生物多样性、以及生态脆弱带和特殊生态系统等几个方面的影响，讨论了各方面的研究现状、主要结论和发展趋势，指出了今后研究中需要重点解决的关键题，并提出了为解决这些问题应采取的研究对策和重点研究领域。
关键词：气候变化 森林生态系统 研究对策

Xiao Yang et al. 1998. Effects of climatic change on forest ecosystems and research strategy for the future. Agricultural Meteorology 19(1):20-25.

Based on a background of systematic analyses and discussions on global climatic changes, the major achievements in research on the climatic changes in China in recent decades, especially in recent years, are described comprehensively. The future probable changes of climate pattern in China are outlined according to general, scattered, and sometimes even contradictory, research information. The effects of climatic changes on forest ecosystems and on aspects of Net Primary Productivity (NPP), geographical distribution, systematic structure, biodiversity, ecotone, and special habitats of forest ecosystems are analyzed. At the same time, the present situation, main results, and future developmental tendency of the research field on the effects of climatic changes are discussed, and the key problems that should be emphasized are pointed out. Finally, research strategy and approaches to resolve the problems are proposed for future improvement of research on climatic changes and their effects on China.

Keywords: climatic change, forest ecosystem, research strategy

张宇，王馥棠，1998，气候变暖对中国水稻生产的可能影响的研究，气象学报，56（3）：369-376

利用随机天气模型，将大气环流模式预测的气候情景与水稻模式相连接，研究了气候变暖对中国水稻生产的可能影响。结果表明，大气中CO_2浓度加倍，中国水稻生产的日数将延长6-11天，积温增加2.20-3.30度·日，积温的相对增长率由南向北呈增长趋势。水稻产量形成期低温天气出现的频率将减少，而高温天气出现的频率将增加。若品种与播种、移栽期不变，水稻产量下

Zhang Yu and Wang Futang. 1998. On the possible impacts of climate warming on rice production in the China. Acta Meterologica Sinica 56(3):369-376.

The possible impacts of climate warming on rice production in China are studied using numerical experiments with the rice simulation model (ORYZA1) based on climate change scenarios projected from global climate models (GCMs) [Geophysical Fluid Dynamics Laboratory (GFDL), United Kingdom Meteorological Office (UKMO), and Max Planck Institute (MPI)]. A stochastic weather generator is used to make the projected climatic change scenarios suitable for input of ORYZA1. The results show that when CO_2 concentration in the atmosphere is doubled, the duration of the rice growing season would be lengthened for 6 to 11days and the accumulated temperature would increase by about 2.20 to

降；而若通过改变品种使作物生育期基本保持目前的状况，减产幅度不品质不变使明显偏小，部分地区还有可能增产。

关键词：作物模式，随机天气模型，全球环流，气候变暖，水稻生产

3.30°C. The possibility of cool injury in the rice yield forming period would decrease whereas that of heat stress would increase. Rice yield would decrease if cultivars and farming practices remain unchanged. However, if the date of rice development stages could be maintained unchanged through variety adjustment, the rice yield in most areas would decrease, and the decrements would be considerably less than if cultivars and farming practices were unchanged.

Keywords: crop model, stochastic weather generator, GCMs, climate warming, rice production

安刚，1998，近九十年吉林省松辽平原作物生长季气温变化的小波分析，气象学报，56（4）：458-466

利用功率谱、小波分析和突变分析方法分析了以长春站为代表的吉林省松辽平原作物生长季（5—9月）平均气温近90年的变化，结果表明其存在3年左右的甚低频振荡，15年和60年左右两个主要长周期振荡，从本世纪20年代初期到50年代初期处于暖阶段，从50年代初期到70年代末期为冷阶段，从70年代末期到90年代中期又处于暖阶段内。预计现在所处的暖阶段将持续到2010年左右。由突变分析结果表明，吉林省松辽平原作物生长季平均气温具有明显的阶段性变化，其各冷暖阶段同小波分析的结果具有很好的一致性，在作物生长季内月平均气温的变化有突变发生。在近期气温变化呈上升趋势。

关键词：松辽平原，作物生长季，气温变化，小波分析

An Gang. 1998. Wavelet analysis of temperature variations of the Song-Liao Plain in crop growth period. Acta Meteorologica Sinica 56(4):458-466.

The temperature variations during the crop growth period of the last 90 years at Changchun Station were analyzed by means of power spectrum, wavelets, and abrupt change methods. Results show that there are very low frequency of (VLF) oscillations about 3 years and, long periods of about 15 years and 60 years. In the Song-Liao Plain, from the early 1950s to the end of 1970s, was a cold period, then since the end of 1970s, is a warm period again. The warm period at present will persist to about 2010. The periodic variation of the temperature was discovered with the abrupt change method. The cold or warm periods are the same as those from the results of the wavelet analysis. In the crop growth period the abrupt changes took place. At present the temperature has a rising tendency.

Keywords: Song-Liao Plain, crop growth period, temperature variations, wavelet analysis

Modeling

秦伯强，于革，Sandy P. Harrison，湖泊水位资料与模型模拟恢复的6000年前全球湿润状况的对比研究，气象学报，56（3）：272-283

模型试验对象是6000a BP的全球湿润状况。模拟试验以检测太阳辐射变化对全球大尺度气候系统的影响为主要目的。观测资料是利用地质证据恢复的古湖泊水位变化，实际上是某地区的有效降水（降水减蒸发）的变化。通过两者的比较发现，所有模拟试验均能重现6000 a BP在亚洲南部与非洲北部的湿润环境，从而证实了因太阳辐射变化导致的亚洲与非洲季风的增强。但模拟的季风增强无论是强度还是范围均小于地质记录。

关键词：6000年前 全球湿润状况 模拟试验 湖泊水位变化 比较研究

Qin Boqiang, Yu Ge, and Sandy P. Harrison. 1998. A comparison of global moisture conditions at 6000 years BP between lake status records and palaeoclimate experiments. Acta Meteorologica Sinica 56(3):272-283.

The objective of this study is the simulated global moisture condition at 6000 years BP. The purpose of the simulation is to verify that changes in insolation influence large-scale climatic systems. The observations used are lake-status records reconstructed from the various geologic evidence. In fact, the lake-level change reflects the variations of moisture conditions, particularly the effective precipitation (precipitation minus evaporation) within the lake basin. The results show that all the experiments can reproduce the wetter conditions in African and Asian monsoon areas, thereby confirming the hypothesis that the enhancement of the Afro-Asian monsoon is induced by seasonal changes of solar radiation. But all experiments fail to produce a broader and more intense monsoon enhancement compared with geologic records.

Keywords: 6000 years BP, global moisture conditions, model experiments, lake status records, comparison study

沈长泗，张志华，1998，采用树木年轮资料重建山东沂山地区200多年来的湿润指数，地理研究，17（2）：150-156

通过运引ARSTAN程序，建立并研究了山东境内沂山地区的树木年轮主年表（1750－1992）。树轮和气候要素的响应面分析得出沂山地区的树轮生长和温度降水呈非线性相关。通过响应函数和回归分析，5月－8月份的湿润指数（P/T）被确定

Shen Changsi and Zhang Zhihua. 1998. Utilizing tree-ring chronologies to reconstruct a 200-year moisture index in Yishan, Shangdong Province. Geographical Research 17(2):150-156.

In this paper, the major tree-ring chronology (1750-1992) in Yishan, Shandong Province, was analyzed by running the program ARSTAN. The resulting analyses of tree-ring and climate data indicate that tree-ring growth in the Yishan Mountains is nonliner correlated with precipitation and temperature. It is unreasonable to reconstruct climatic variables separately using traditional methods. The reconstructed moisture index (P/T) during May to August, in which both temperature and precipitation influence the tree-

为重建对象，该湿润指数值代表了温度和降水对树轮生长的共同影响，且相关性很高，远超过信度检验。利用线性回归方法，获得重建湿润指数的预报方程，用树木年轮表重建了自1750年以来的沂山地区逐年5月-8月湿润指数变化。

关键词：沂山 树轮 湿润指数 气候重建

ring growth, was estimated from a response function and regression model. The relationship between tree-ring growth and moisture index (May to August) is obvious. The predictive equation was obtained from a linear regression model. As a result, the local moisture index (May to August) since 1750 AD at Yishan, Shandong Province, was reconstructed based on tree-ring chronologies.

Keywords: Yishan, tree ring chronologies, moisture index, climate reconstruction

*方之芳*等，1998，1966~1991年北极海冰模拟结果与观测的对比，大气科学，22（3）：305-317

利用宇如聪等1995年建立的北极区域冰洋耦合模式，以1966－1991年期间逐月的月平均实测海平面气温和气压场为强迫场，模拟了上述26年间北极海冰的时间演变和空间分布，着重分析了大西洋及欧洲沿岸一侧的巴伦支海状况，并与目前能够得到的北极海冰密集度观测资料做了对比，结果表明：（1）模式对巴伦支海海冰年际变化的模拟是比较成功的，（2）模式未能在格陵兰海模拟出观测一致的年际变化。（3）模拟和观测的巴伦支海和格陵兰海冰的季节循环均滞后于气温的季节循环，但模拟结果滞后的时间更长。

关键词：北冰洋 热力学海冰模式 巴伦支海 格陵兰海

Fang Zhifang et al. 1998. Comparison of Arctic sea ice variation during 1966-1991 between an ocean–sea-ice model and observation. Scientia Atmospherica Sinica 22(3):305-317.

The variations of sea ice in the Arctic Ocean from 1966 to 1991 are simulated using an Arctic Ocean circulation and thermodynamic sea ice model developed by Yu Rucong et al. in 1995. The model is run with boundary conditions from observed monthly sea surface temperature, air temperature, and pressure. Analyses focus on the simulation of sea ice in the Barents and Greenland seas where the fluctuations of sea ice are more significant than in other regions. The results indicate that (1) the simulation of sea ice in the Barents Sea is successful, reflecting not only the interannual variability during 1969 to 1987 but also two extreme events (i.e., sea ice is extremely heavy in 1979 and extremely light in 1984) which are in good agreement with observation; (2) the simulation of annual variability of sea ice in the Greenland Sea is not consistent with observation; (3) both the observed and simulated sea-ice seasonal cycle in the Barents and Greenland seas lag behind the seasonal cycle of surface air temperature, but the lag time of the latter is more significant.

Keywords: Arctic Ocean, thermodynamic sea-ice model, Barents Sea, Greenland Sea

Radiation and Trace-Gas Emission

*杨汉东*等，1998，江汉平原长湖近代沉积无磁性测量及其气候意义，地理科学，18(2): 135-138

本文根据长湖代表性的磁性测量结果数据，在化学分析和孢粉分析的基础上研究了长湖近代沉积物磁性参数变化与气候变化的关系。结果认为，该地区最近400年来气候变化总趋势是一个由冷变暖的过程。
关键词：湖泊沉积物 磁性测量 气候变化

Yang Handong et al. 1998. Magnetic measurements of recent sediments in Lake Changhu of the Jianghan Plain and their climatic implications. Scientia Geographica Sinica 18(2):135-138.

Using data of magnetic measurements of sediments from Lake Changhu, the authors studied the relationship between magnetic parameter changes and climatic changes in the Changhu area according to chemical analysis and spore-pollen analysis. The study shows that the tendency of the climatic changes is from cold to warm in the Jianghan Plain in recent 400 years.

Keywords: lake sediment, magnetic measurements, climatic change

*刘晓东*等，1998，青藏高原当代气候变化特征及其对温室效应的响应，地理科学，18(2)：113 –121

本文利用30年青藏高原地区的气温和降水资料，分析了高原地区当代气候变化的总体特征，同时结合GCM模拟结果，讨论了高原气候对全球变暖的响应。结果表明，高原气温上升和降水增加与大气CO_2含量增加有关。
关键词：青藏高原 气候变化 温室效应

Liu Xiaodong et al. 1998. Contemporary climatic change of the Qinghai-Xizang Plateau and its response to the greenhouse effect. Scientia Geographica Sinica 18(2):113-121.

The characteristics of contemporary climatic change over the Qinghai-Xizang Plateau are analyzed on the basis of monthly temperature and precipitation data for 30 years. The response of the plateau climate to the global warming is discussed in combination with global climate model (GCM)-simulated output. Results show that the plateau climate has been warming and precipitation change has been increasing in the recent 30 years and that these climatic trends seem to be related to the enhanced greenhouse effect induced by increasing CO_2 concentration in the atmosphere.

Keywords: Qinghai-Xizang Plateau, climatic change, greenhouse effect

方精云，位梦华，1998，北极陆地生态系统的碳循环与全球温暖化，环境科学学报，18(2): 113-121

本文分析了全球温暖化与北极陆地生态系统碳循环的关系，指出近代全球大气CO_2和CH_4显著增加，导致全球温暖化。分析表明，北极陆地生态系统是一个巨大的土壤碳库，该系统起着大气CO_2汇的作用，但大气CO_2浓度增加导致的气温上升将对北极土壤碳库和CO_2的源汇功能产生影响。

关键词：北极 陆地生态系统 碳循环 全球温暖化 CO_2 土壤碳库

Fang Jingyun and Wei Menghua. 1998. Carbon cycle in the Arctic terrestrial ecosystems in relation to global warming. Acta Scientiae Circumstantiae 18(2):113-121.

This paper analyzes the relationship between global warming and the carbon cycle in the Arctic terrestrial ecosystems. It points out that atmospheric carbon dioxide and methane concentrations increased markedly during the past few centuries and caused the global warming. Analyses show that the Arctic is a huge organic carbon pool and a sink of atmospheric carbon dioxide. The global rise of air-temperature resulting from an increase in atmospheric carbon dioxide would influence markedly Arctic soil carbon and the carbon dioxide source/sink relationship of the ecosystems.

Keywords: Arctic terrestrial ecosystem, carbon cycle, global warming, CO_2, soil carbon pool

*金会军*等，1998，青藏高原花石峡冻土站高寒湿地CH_4排放研究，冰川冻土，20(2): 172-174

作者调查了青藏高原花石峡冻土站高寒湿地CH_4排放。各个植物群落内部和不同群落之间CH_4的排放量变化都很大。花石峡地区高寒湿地基本可分为潮湿高寒草甸、沼泽化草甸、杉叶藻沼泽和毛柄水毛茛沼泽。青藏高原高寒湿地CH_4年排放量约为1 $Tg \cdot a^{-1}$。

关键词：青藏高原 高寒湿地 CH_4排放 观测研究

Jin Huijun et al. 1998. Study on CH_4 fluxes from alpine wetlands at the Huashixia Permafrost Station, Tibetan Plateau. Journal of Glaciology and Geocryology 20(2):172-174.

The study of methane (CH_4) fluxes of Huashixia in the Tibetan Plateau indicates that intra-site and inter-ecosystem variations of the CH_4 fluxes were very strong. Ecosystems in the studied region can be roughly divided into four groups. The CH_4 fluxes from alpine wetlands on the Tibetan Plateau are 1 Tg/year.

Keywords: Tibetan Plateau, alpine wetlands, methane emission, transect study

黄国宏，陈冠雄，张志明，吴杰，黄斌, 1998,
玉米田N_2O排放及减排措施研究，
环境科学学报，18（4）：344-349

用封闭式箱法对玉米田N_2O排放进行了全年、系统的原位观测，发现N_2O排放有明显的季节变化，主要排放期是在作物的生长季节。另外，玉米植株能通过其根系的作用增加土壤向大气排放N_2O。应用长效碳酸氢铵和缓释尿素于玉米田，在施入等量氮的情况下，定时监测N_2O的排放量，结果表明，上述二种长效肥料与普通尿素和碳酸氢铵相比，能明显减少土壤中N_2O排放，并能够提高玉米产量，此外还发现，在玉米生长的后期，它们在土壤中能保持较高含量的硝态氮和铵态氮，说明它们都能使肥料缓慢地释放到土壤中，供作物长期吸收利用，使作物吸收到足够的氮，同时它们的这一特殊作用也减少了土壤微生物的硝化和反硝化过程大量城市的N_2O。因此，它们具有经济呵呵环境双重效益并有着广阔的应用前景。
关键词: 玉米田 N_2O排放 减排措施

Huang Guohong, Chen Guanxiong, Zhang Zhiming, Wu Jie, and Huang Bin. 1998. N_2O emission in maize field and its mitigation. Acta Scientiae Circumstantiae 18(4):344-349.

Nitrous oxide (N_2O) fluxes from a maize field were measured systematically in situ for a whole year using a closed chamber technique. The results show that N_2O emission has significant seasonal variation and mainly occurs during the growing stage of the crop. In addition, the maize plant can stimulate N_2O production through the function of its root in soil. Compared with urea and ammonium bicarbonate, slow-releasing ammonium bicarbonate (ammonium bicarbonate +dicyandiamide) and slow-releasing urea (urea + hydroquinone + dicyandiamide) can not only reduce N_2O emission in a maize field but also cause an increase of maize yield of 14%.

Keywords: maize field, N_2O emission, mitigation measures

*郑循华*等，1998，农田NO排放的自动观测，中国环境科学，
18（2）：1-5

详细介绍农田NO排放自动观测的方法原理，系统整体构造及电路和气路配置，并讨论了观测结果的可靠性。同时，还就已取得的一些初步研究结果进行了分析。对华东秋冬季麦田的NO排放具有与温度几

Zheng Xunhua et al. 1998. Automatic measurement of NO emission from croplands. China Environmental Sciences 18(2):1-5.

The principle, structure and procedure of an automated system for the measurement of NO emission from croplands is described in detail. Some experimental results taken from wheat fields of Southeast China with this automated system are also discussed. In this study, the diurnal variation of NO emission from wheat fields that occurs in late autumn was found to be similar to the diurnal variation of temperature. Meanwhile, a seasonal

乎完全同步的日变化规律，NO排放的季节变化也十分明显，秋季的平均NO
排放通量约为冬季的6－15倍，且施氮肥114kg / hm^2纯氮的NO排放量要比对照处理高2－7倍，温度和施肥是影响华东秋冬季麦田NO排放的关键因子。
关键词：NO排放　自动观测　自动系统 农田 排放通量

variation of NO emission was observed, with the mean value of NO emission fluxes measured in late autumn about 6 to 15 times higher than that in winter. Additionally, the seasonal total amount of NO emission from a plot with N-fertilization at a rate of 114 kg/hm^2 was 2 to 7 times that from the plot without N-fertilization. Such results mean that temperature and application of N-fertilizer are two key factors that regulate the NO emission from wheat fields in late autumn and in winter.

Keywords: NO emission, automatic measurement, automated system, croplands, emission flux

岳明，王勋陵，1998，紫外-B辐射增强对小麦和燕麦繁殖特性影响的研究，中国环境科学，18（1）：68-71

模拟15%臭氧层减薄水平，研究了紫外-B（UV-
B）辐射增强对小麦的花粉活力及萌发特性以及粒籽产量与其萌发特性的影响。小麦和燕麦的繁殖特性对紫外辐射的敏感性差异很大。增强的紫外辐射显著抑制了燕麦的籽粒产量及萌发率，而对小麦的繁殖效率没有显著影响，小麦花粉活力及萌发率的降低可由穗数增加予以补偿。
关键词：紫外辐射　小麦　燕麦　花粉　种子萌发

Yue Ming and Wang Xunling. 1998. A preliminary study of the responses of wheat and oat reproductive characteristics to enhanced UV-B radiation. China Environmental Sciences 18(1):68-71.

The pollen vitality and germination and also seed yield and germination of wheat (*Triticum aestivum* CV, 80101) and oat (*Avena sativa* VC Bayaer –3) under supplementary UV-B radiation from an approximately 15% ozone layer depletion were researched. There are sensitivity differences of reproductive characteristics to UV-B radiation between wheat and oat. The seed yield of oat and its germination rate (25C, in dark) were inhibited significantly by UV-B radiation enhancement, whereas there was no effect of UV-B radiation on the seed yield and germination rate of wheat. The decrease of wheat pollen vitality and germination rate by UV-B radiation enhancement could be compensated for by increasing the numbers of ears per plant under supplementary UV-B radiation. The effects of UV-B radiation are related to metabolic changes of physiologically active compounds in pollen and seed that are connected with their germination.

Keywords: ultraviolet radiation, wheat, oat, pollen, seed germination

庄亚辉，曹美秋，王效科，冯宗炜，1998，中国地区生物质燃烧释放的含碳痕量气体，环境科学学报，18（4）：337-343

为了研究中国地区生物质燃烧不同阶段的各种痕量气体排放比与排放因子，建立了动态与静态燃烧室以及CH_4、COS、CO及CO_2的采样、富集、分析方法；然后对典型乔木、灌木与草的地上部分生物质进行规模不同的燃烧实验，测得痕量气体的排放比和排放因子，根据全国森林生态系统碳贮量的估计及火灾统计资料，初步测算了中国地区生物质向大气中释放含碳痕量气体量。

关键词：生物质燃烧　森林火灾　痕量气体　排放因子

Zhuang Yahui, Cao Meiqiu, Wang Xiaoke, and Feng Zongwei. 1998. Carbon-containing trace gases emitted during biomass burning in China. Acta Scientiae Circumstantiae 18(4):337-343.

Dynamic and static combustion systems, composed of combustion bed; ignition device; electronic balance; temperature- and flow-rate sensors; sampling device; nondispersive infrared (NDIR), flame ionization detection (FID)/DC, electron capture detection/gas chromatography (ECD/GC), and relative percent difference/gas chromatography (RPD/GC) analyzers; datalogger; and computer, were used for the study of biomass combustion emissions. Samples of the above-ground components of typical Chinese tree, shrub, grass, and crop species were collected and burned under flaming and smouldering stages as well as in flowing and closed systems. The emission factors of CO, CO_2, CH_4, COS and emission ratios of CO/CO_2 and CH_4/CO_2 were determined. Meanwhile, a comprehensive investigation on the carbon pool of vegetation in China was performed. The Chinese forest and crop biomass inventory has been established, including the components and layer biomass of 16 main forest types and 4 eco-climatic regions as well as the major crops in China. To reduce statistical uncertainty in biomass estimation, all forests were classified into young, middle-aged, premature, mature, and overmature categories. Based on the vegetation carbon pool inventory and our emission factors, we made a preliminary estimation of the spatial distribution of trace gas emisssions from fuelwood, crop residues, and forest fire.

Keywords: biomass burning, forest fire, trace gases, emission factor

*王明星*等，1998，稻田甲烷排放及产生、转化、输送机理，大气科学，22（4）：600-612

通过对中国五大水稻产区稻田甲烷排放的多年观测实验，描述了稻田甲烷排放的时空变化规律及特征并分析研究了其形成机理。稻田甲烷排放的日变化有四种类型，甲烷的

Wang Mingxing et al. 1998. Methane emissions and mechanisms of methane production, oxidation, and transportation in rice fields. Scientia Atmospherica Sinica 22(4):600-612.

Methane (CH_4) emission rates from Chinese rice fields have been measured in all the five major rice culture regions in China. Four types of diurnal variations of CH_4 emission rates have been found. Seasonal variation patterns of CH_4 emission differ slightly in different field locations, where climate system, cropping system, and other factors are

传输效率是日变化形成的主要因素。稻田甲烷土壤中排放率的季节变化形式在不同的地区是不同的，这取决于气温变化、水稻品种、施肥及水管理等不同因素。甲烷产生主要发生在稻田土壤耕作还原层（2～20cm），氧化主要发生在水土交界面的氧化层和根部氧化膜，并受多种因子的影响。土壤中的甲烷通过三个路径向大气排放，不同时期三个路径在甲烷传输中的相对重要性不同。施用化肥和沼渣肥可以降低土壤中甲烷的产生和排放，而有机肥会增加土壤中甲烷的产生和排放。中国的稻田每年向大气中排放9.67－12.66百万吨甲烷，全球稻田甲烷的总排放量约为35～56Tg/a。

关键词：甲烷排放　日变化　季节变化　氧化和传输　影响因子

different. CH_4 production mainly occurs in the reduced soil layer (2 to 20 cm). CH_4 is oxidized mainly in the thin surface layer of paddy soil and in the rhizosphere of rice plants. Production and oxidation rates are affected by many factors. CH_4 transport is through rice plant, gas bubble, and diffusion in flooded water. The relative importance of each route is different at different stages during rice growing. The effects of various mineral fertilizers on CH_4 emission were rather contradictory, but the amount and the type of organic manure are shown to enhance CH_4 emission from rice fields, which has been also indicated by CH_4 production rates. Application of fermented sludges from biogas generators and farmyard-stored manure instead of fresh organic manure seems to be promising. China's rice fields contribute about 9.67 to 12.66 Tg/year to the atmosphere. The total methane emission from global rice fields can be estimated as 35 to 56 Tg/year.

Keywords: methane emission, diurnal variation, seasonal variation, oxidation and transport, influence factors

白建辉，王庚辰，1998，1979~1996年期间北京地区太阳紫外总辐射的变化趋势，大气科学，2（5）：709-717

对实际天气条件下北京地区1990年1月至1992年8月太阳辐射观测资料进行了详细的分析，得到了实际天气条件下到达地面的太阳紫外总辐射的计算公式。结果表明，计算值与观测值吻合的比较好。最后，利用此公式计算了北京地区1979年1月～1996年6月的太阳紫外总辐射，并讨论了1979～1996年北京地区太阳紫外总辐射的变化趋势。

关键词：太阳紫外总辐射　大气臭氧总量　气溶胶

Bai Jianhui and Wang Gengchen. 1998. Variation trends of solar UV radiation in Beijing during 1979-1996. Scientia Atmospherica Sinica 22(5):709-717.

The formula for calculating solar UV radiation at the ground under actual sky conditions is given by using the observation data of solar radiation during the period from January 1990 to August 1992 in the Beijing area. The results show that the calculated values agree well with those observed. This formula is used to calculate the solar UV radiation and discuss its variation trends during 1979-1996 in Beijing.

Keywords: solar UV radiation, total ozone amount, aerosol

*杨理权*等，1998，火山气溶胶对北京大气臭氧总量变化趋势的影响，大气科学，22（5）：686-692

分析了1979－1995年北京地区臭氧总量的变化趋势。1980－1994年整层气溶胶光学厚度和1981－1985、1990－1994年平流层气溶胶光学厚度。分析依据的数据总量来自Dobson仪器所所观测的臭氧总量和太阳辐射表提供的气溶胶光学厚度总量，结果表明，1979－1995年期间北京地区臭氧总量年变化率为-0.269%，1982－1985、1991－1994年间臭氧总量年变化率分别高达-0.954和-1.439%。这说明厄尔奇琼火山和皮纳图博火山爆发对臭氧总量减少可能起到重要作用。

关键词 臭氧 气溶胶 北京

Yang Liquan et al. Effects of volcanic aerosol on ozone change trends over Beijing. Scientia Atmospherica Sinica 22(5):686-692.

Ozone change trends for the period 1979-1995, column aerosol optical depth for the period 1980-1994, and the stratospheric aerosol optical depth for the periods of 1981-1985 and 1990-1994 over Beijing are analyzed using ozone data measured with Dobson and aerosol optical depth data with a photometer. The results show that the ozone yearly change rate over Beijing is –0.269% from 1979-1995 and reaches up to -0.954% and -1.439% for the periods of 1982-1985 and 1991-1994 respectively, which means that the eruptions of El Chichon and Pinatubo volcanoes have important effects on decreases in total ozone amount.

Keywords: ozone, aerosol, Beijing

*白建辉*等，1998，森林排放非甲烷碳氢化合物的初步研究，大气科学，22（3）：247-251

1995年6月至1996年4月，在广东肇庆鼎湖自然保护区每两周采样一次，利用0.8L不锈钢采样和气相色谱法分析、研究森林排放的非甲烷碳氢化合物的浓度。结果表明，森林排放的异戊二烯有明显的季节变化，其浓度与温度有明显的正相关关系。

关键词：森林 非甲烷碳氢化合物 异戊二烯 气温

Bai Jianhui et al. 1998. Primary study on the concentrations of nonmethane hydrocarbon emitted from the forest. Scientia Atmospherica Sinica 22(3):247-251.

We used 0.8 L stainless steel flasks for air sampling twice weekly from June 1995 to April 1996 and gas chromatograph-flame ionization detector (GC-FID) to analyze the concentrations of nonmethane hydrocarbons (NMHC) in the Dinghushan Mountain biosphere protection zone, Zhaoqing City, Guangdong Province. The results show that the concentration of isoprene emission from the forest has an evident seasonal variation and a positive correlation with air temperature.

Keywords: forest, nonmethane hydrocarbon, isoprene, air temperature

*任福民*等，1992，近十五年全球臭氧变化，气象学报，
56（4）：485-492

利用卫星观测臭氧总含量TOMS资料，在剔除年变化后对全球60°S－60°N范围首先进行了沿纬度分布的线性趋势和周期分析。结果表明，自本世纪70年代末，各纬带上的臭氧总量都呈下降趋势，强度随纬度升高而加剧，并发现总体上北半球臭氧的下降趋势较南半球更加明显；同时证实了准两年振荡是臭氧变化中除年周期外最显著的周期。并对臭氧变化中的准两年振荡作了遥相关分析；发现准两年振荡在强度和位相上基本呈纬向分布并主要表现出赤道对称的特征。

关键词：全球臭氧，变化趋势，准两年振荡

Ren Fumin et al. 1998. Study on changes of ozone over the globe during the past 15 years. Acta Meteorologica Sinica 56(4):485-492.

This study examines the linear trend and the periodic variation of the zonal mean total ozone over 60°S-60°N, based on global TOMS (Total Ozone Mapping Spectrometer) data for the period Nov. 1978-April 1993 after correcting for the annual variation. The results show that since the end of the 1970s, total ozone decreased at all latitudes with larger trends at higher latitudes, whereas the trend of ozone change in the Northern Hemisphere is greater than that in the Southern Hemisphere of the same latitude. Meanwhile, it is discovered that quasi-biennial oscillation is the most significant factor in the changes of ozone correcting for the annual variation. Also teleconnection analysis for the quasi-biennial oscillation has been done, and the result shows that zonal distribution and equatorial symmetry in intensity and phase are the main characteristics of quasi-biennial oscillation in the changes of ozone.

Keywords: global ozone, trend of change, quasi-biennial oscillation